

Employment Outcomes of Indigent Clients Receiving Alcohol and Drug Treatment in Washington State

Office of Applied Studies



**DEPARTMENT OF HEALTH AND HUMAN SERVICES
Substance Abuse and Mental Health Services Administration**

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By

**Thomas Wickizer, Ph.D.
Jutta Joesch, Ph.D.
Dario Longhi, Ph.D.
Antoinette Krupski, Ph.D.
Kenneth Stark, M.B.A, M.E.D.**

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

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EXECUTIVE SUMMARY

Background and Purpose

Finding effective approaches for treating alcohol and other drug abuse remains a critical public health problem. In the current era of constrained resources, it is especially important to understand which types of treatment are most effective. Although considerable progress has been made in advancing knowledge about treatment outcomes, important gaps remain. Relatively little is known about treatment outcomes for indigent clients, especially in the area of employment.

Responding to the need for improved information, the Division of Alcohol and Substance Abuse (DASA), within the Washington State Department of Social and Health Services, sponsored a project to evaluate treatment outcomes for indigent clients in a number of areas, including medical care use, employment, use of public assistance, and treatment reentry. This project was conducted in 1992 and 1993 by the state Office of Research and Data Analysis (ORDA) within the Department of Social and Health Services.

Over the course of this study, new issues and questions emerged related to health reform, cost containment, and managed care, which had implications for chemical dependency treatment. The Substance Abuse and Mental Health Services Administration, Office of Applied Studies (SAMHSA/OAS), U.S. Public Health Service offered to support secondary analysis of the data in the area of employment outcomes. This project involved no new data collection; all of the data analyzed were collected through the previous ORDA study.

This project had several aims, including:

- *To describe clients' earnings and employment status over time*
- *To assess whether employment outcomes are influenced by type or duration of treatment*
- *To examine what types of clients benefit most from treatment*
- *To analyze treatment benefits in relation to costs*

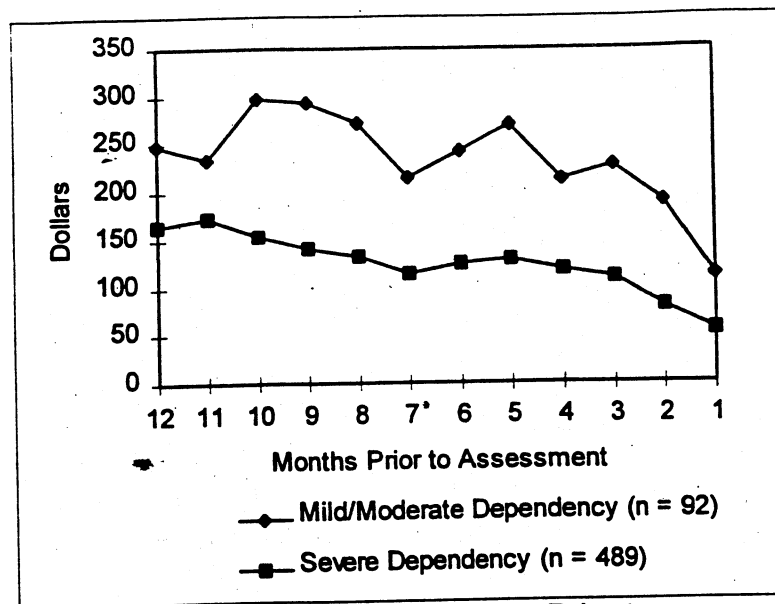
Methodology

The population studied represents indigent clients who were assessed for treatment during a four-month period beginning in August 1989. Treatment was provided to these clients through the Washington State Alcoholism and Drug Addiction Treatment and Support Act (ADATSA). The treatment group (n = 499) consisted of clients receiving care in the following modalities: 1) intensive (non-hospital based) inpatient treatment (<30 days), 2) long-term (90 days or more) residential treatment, 3) recovery house (shorter-term halfway house focused on return to the community), and 4) outpatient (not methadone) treatment. The comparison group (n = 168) included clients who went through assessment but who did not initiate treatment. It was not possible to randomly assign clients to treatment. Thus, the results reported here may have been influenced in some unknown way(s) by selection bias.

A series of multivariate analyses were performed to evaluate employment outcomes, measured in terms of the percentage of quarters in which clients worked and monthly earnings. The data on employment and earnings were obtained from official state employment records. Information on client characteristics and treatment were obtained from assessment centers and treatment programs. The employment data cover a 12-month period before treatment and an 18-month period after treatment. The analysis controlled for a large number of factors, including prior employment, education, ethnicity, prior treatment, mental disability, age, and age of first use.

Results

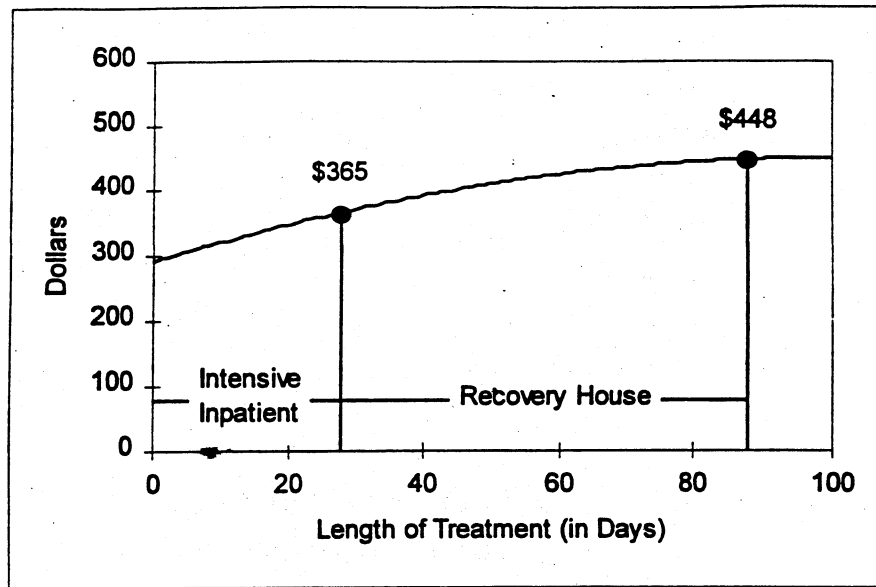
Earnings decreased over the 12-month period prior to treatment, especially for clients whose drug or alcohol dependence was severe. Clients with severe dependency had substantially lower earnings throughout the pre-treatment period and experienced a larger relative decrease in earnings.



**Average Monthly Earnings Prior to
Assessment by Dependency Status**

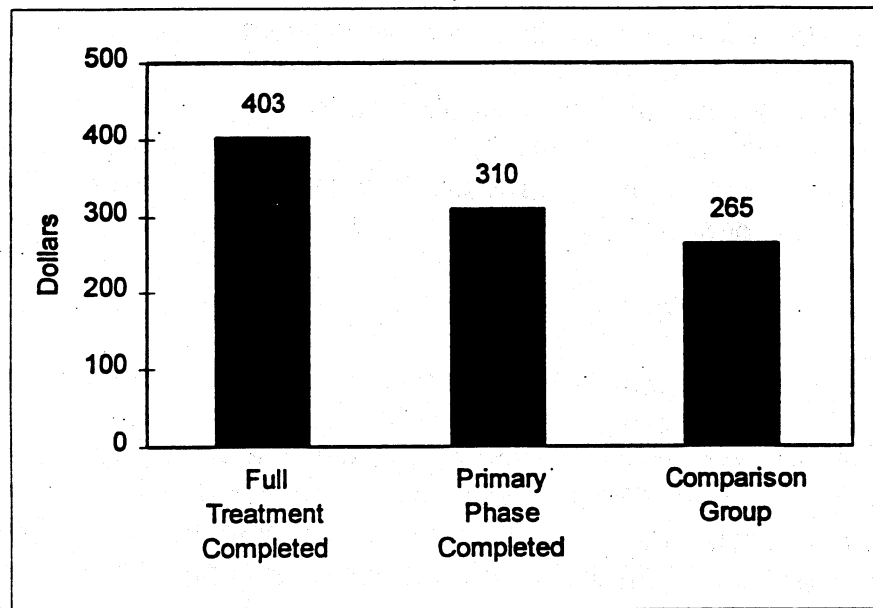
The duration of treatment was positively associated with employment and earnings. However, days of inpatient treatment had a greater relative effect than days of outpatient treatment. For every day of inpatient care received, earnings increased, on average, by \$1.30, other things equal. Thus 60 days of inpatient treatment, e.g., 30 days of intensive inpatient treatment followed by 30 days of care in a recovery house setting, would lead to an expected increase in earnings of \$78 per month, approximately 33% above the expected earnings (\$320 versus \$242 per month) of clients who received no treatment. Clients receiving outpatient treatment would also have expected higher earnings than clients who received no treatment, but the estimated incremental gain in monthly earnings per day spent in treatment would be less (\$1.04 per day).

The largest incremental gains in post-treatment earnings were associated with the initial stage of inpatient treatment, but important gains were also associated with recovery-house care, as shown below. Clients who stayed in treatment and received 60 days of care in a recovery house had earnings that were 23% greater, on average, than clients who terminated treatment after the initial inpatient stay of 28 days. The same general pattern was observed for outpatient clients (i.e., the greatest gains in earnings were observed during the initial stage of treatment), but the magnitude of the increase in earnings was less, by about a third, than for inpatient treatment.



Adjusted Monthly Earnings Associated with Length of Residential Treatment

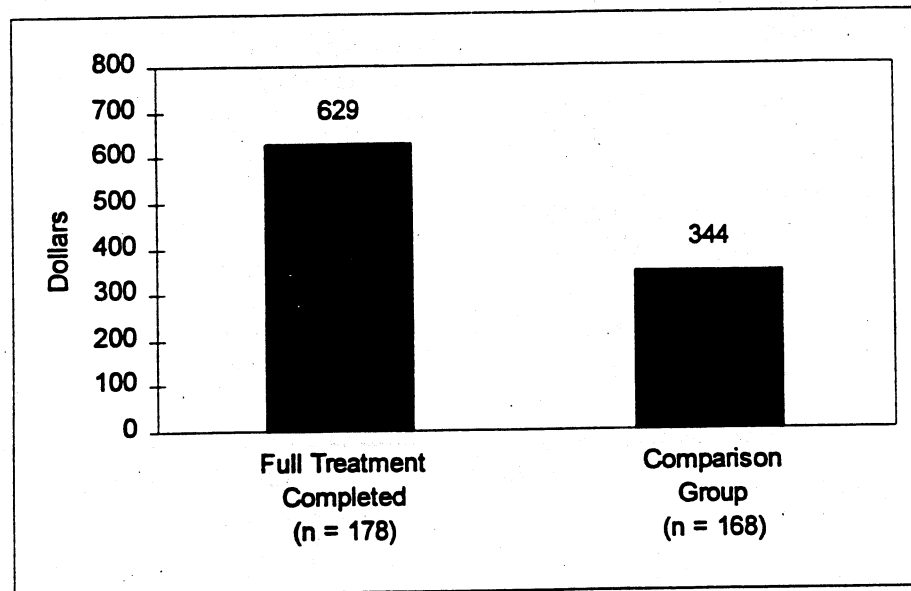
Completing the full continuum of treatment was an important predictor of outcomes. Clients who completed treatment both worked more and earned more. Differences in adjusted earnings are shown below.



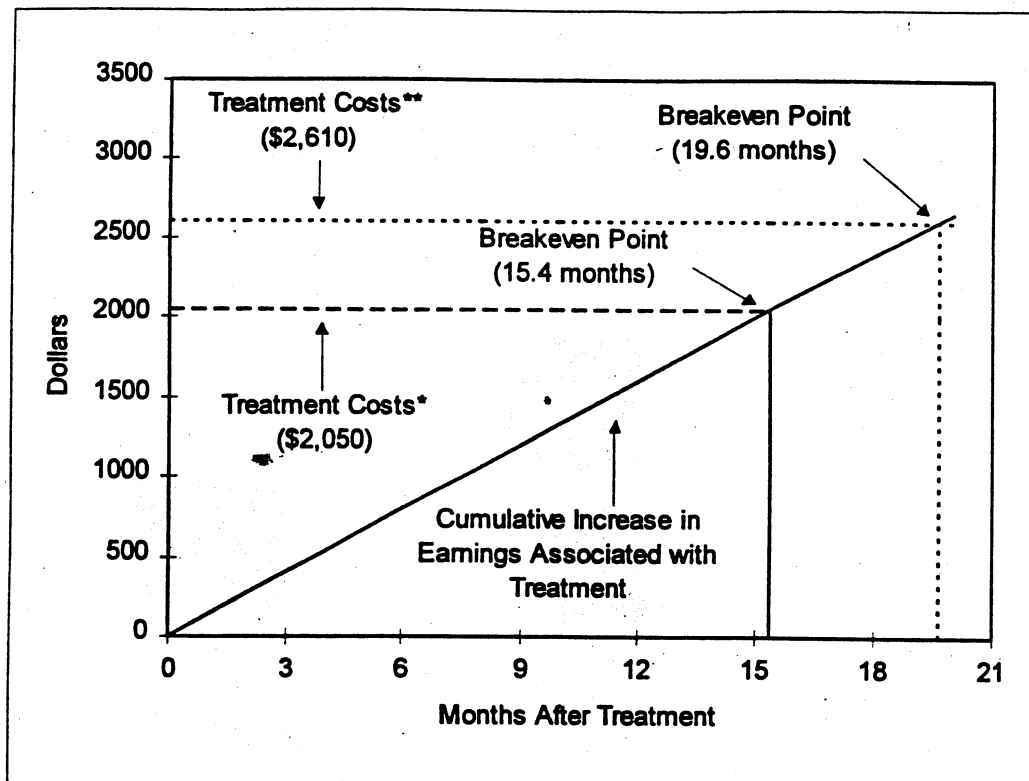
Adjusted Monthly Earnings for Selected Inpatient Treatment Groups

The adjusted earnings figures shown above depict the experience of an "average client." That a sizeable number of clients had minimal earnings is reflected in the earnings figures. But some clients were able to obtain

employment that led to substantial gains in income. The figure below depicts the post-treatment monthly earnings for clients at the 75th percentile of the earnings distribution. As shown, clients completing the full continuum of treatment had earnings of \$629, as compared to \$344 for clients in the comparison group.



Treatment appears to convey favorable benefits in relation to costs. Note the benefits analyzed here are limited to gains in earnings, not other benefits of treatment, such as reduced morbidity and mortality or decreased criminal activity. The estimated cumulative increase in earnings of a hypothetical client receiving 28 days of intensive inpatient treatment followed by 30 days of recovery-house care would be \$2,050 within 16 months, an amount equal to the cost of treatment. Even if a client relapsed and re-entered inpatient treatment for 14 days, thereby increasing total treatment costs, the estimated "breakeven" point (costs equal benefits measured as enhanced earnings) would be 20 months.



Estimated Earnings Compared with Treatment Costs

- * Costs represent 28 days of intensive inpatient care followed by 30 days of residential follow-up support care.
- ** Treatment costs assuming the client relapsed and re-entered intensive inpatient treatment and stays and additional 14 days. This would increase costs from \$2,050 to \$2,610 and thus lead to a different breakeven point, as shown in the figure.

Conclusions

Several important conclusions regarding treatment outcomes related to employment emerge from our findings:

- 1) *Inpatient care appears to have a greater impact on employment and earnings than outpatient care for indigent clients with serious alcohol and other drug problems.*
- 2) *The duration of treatment has an important effect on employment outcomes. Clients staying in treatment longer experience better outcomes, as do clients who complete treatment.*
- 3) *The benefits of treatment in terms of enhanced earnings compare favorably with the costs of treatment.*

What are the policy implications of our findings? Put simply--***less treatment may not necessarily be less costly***. Limiting coverage for chemical dependency treatment for public clients will reduce short-run treatment costs, but may also compromise important benefits of treatment, such as enhanced employment. There appear to be important tradeoffs between investment of resources in treatment and outcomes. Limiting access to care to reduce treatment costs in the short run may be "penny-wise and pound-foolish" public policy.

I. INTRODUCTION

Background and Rationale

Drug and alcohol abuse in Washington State results in significant economic loss.¹ Increased attention is being given to developing prevention strategies and to documenting the effects of treatment. In the current era of tight public budgets and diminishing resources, assessing treatment outcomes has taken on added importance. Information about treatment outcomes has improved,²⁻¹² but important gaps in knowledge remain. For example, understanding of the specific factors that make some treatments more effective than others is incomplete, and uncertainty exists over the amount of treatment that may be warranted. Do unstable clients with severe alcohol dependence exhibit better outcomes after 21 days of inpatient treatment rather than 14 days? Is there a beneficial effect of providing clients with a continuum of treatment, e.g., intensive inpatient treatment followed by residential support services and outpatient treatment? These types of questions need to be addressed in order to achieve more efficient allocation of scarce treatment resources.

Health Reform and Managed Care

Trends and pressures operating within the health care system have created additional need for information on treatment outcomes. Many health reform proposals at both the state and federal level have included substance abuse treatment as a covered benefit. Providing coverage for substance abuse treatment under health reform requires knowledge of treatment effectiveness. Currently, there is great interest in managed care as an approach to delivering health services, especially to Medicaid patients, and managed care's role in delivering drug and alcohol treatment is likely to expand in the future.

Managed care plans control utilization by limiting service eligibility and through case management and other utilization review activities. But if client outcomes are compromised because of restrictions placed on treatment utilization, costs associated with substance abuse may actually increase in the long run. Thus there is need for better understanding of treatment outcomes for the formulation of public health policy as well as for the development of improved clinical management strategies.

Study Focus and Sponsorship

This study assesses treatment outcomes among a client group that has been largely overlooked in evaluation research, namely, indigent clients with severe substance abuse dependence. The outcomes analyzed are employment and (legal) earnings, which represent important indices of social functioning and productivity. Many indigent persons receive public support in the form of welfare payments, Medicaid, vocational counseling, food stamps and other support services. Whether substance abuse treatment can enhance the economic independence of indigent clients is a question with considerable policy relevance. Cutbacks in public social welfare programs and growing public pressure to develop strategies to reduce people's long-term dependence on welfare and government support programs have raised new important questions about the effects of substance abuse treatment.

This study emerged from the shared interests of the Washington State Division of Alcohol and Substance Abuse (DASA) and the Substance Abuse and Mental Health Services Administration, Office of Applied Studies (SAMHSA/OAS). DASA sponsored an earlier 18-month follow-up study to analyze client outcomes in several areas, including employment, medical care use, public assistance use, and readmission to treatment. This study was conducted during 1992 and 1993 by the Office of Research and Data Analysis (ORDA) within the Washington State Department of Social and Health Services. It gathered detailed information on treatment outcomes, based on data contained in official state records and data systems, e.g., employment records and Medicaid files.

Over the course of the ORDA study, new issues related to health care reform, cost containment, and managed care emerged as important public health policy issues, with implications for substance abuse treatment. The scope of the ORDA study did not permit detailed analyses related to these issues. SAMHSA/OAS offered to support further (secondary) analyses of the data. All of the data analyzed for the current project were previously collected by ORDA; no new data collection was performed for the project.

Study Objectives

The purpose of this study is to examine employment outcomes among indigent clients receiving treatment for drug and alcohol dependency. The study population consists of clients whose treatment was funded under the Washington State Alcoholism and Drug Addiction Treatment and Support Act (ADATSA), described more fully below.

The specific aims of this analysis are:

- ***To describe clients' earnings and employment status over time***
- ***To assess whether employment outcomes are influenced by type or duration of treatment***
- ***To examine what types of clients benefit most from treatment***
- ***To assess outcomes in relation to treatment costs***

To address these aims, we performed a series of descriptive and multivariate analyses. Since the latter analyses were not based on experimental data (i.e., data generated by random assignment of clients to treatment and control groups), problems of selectivity bias may arise. For example, if clients completing treatment were more highly motivated, observed differences in outcomes could be due to unmeasured motivation rather than to treatment itself. Differences in employment outcomes between client groups (outpatient versus inpatient clients) may also be due to selection resulting from ADATSA referral procedures (less severely dependent cases would normally be referred for outpatient treatment). Therefore, caution should be used in making inferences regarding treatment effectiveness.

One major strength of this study is its external validity. The clients analyzed received treatment in a variety of settings and from different programs, which enhances the generalizability of the findings. Longabaugh and Lewis¹³ refer to such studies as multi-site naturalistic studies and note, "....they best represent empirical relationships between treatment factors and patient outcomes in the *everyday world of treatment*" [italics added].

Report Organization

This report is organized in four major sections. This introductory section concludes with a review of selected literature on treatment outcomes. Following this is a methods section, which describes the ADATSA program, the study population, the data, measures and statistical procedures. The third section presents the results and findings of the analyses, beginning with descriptive information on clients' employment and earnings over time. The final section of the report concludes by summarizing the key findings and describing the policy implications of the analysis. In preparing this report, we have sought to keep the presentation of analyses non-technical in nature. Supporting technical material and more detailed information on results are included in the appendices.

Literature Review

Outcomes: Reduced Drug and Alcohol Use

Numerous evaluations and outcome studies have been conducted over the past 25 years to assess the effects of substance treatment.^{2-12,14-22} These studies have yielded a wide range of findings, with some showing clear evidence of a treatment effect but others producing little or no evidence. The differences in findings reflect, in part, differences in methodological approach, statistical procedures, data, and client populations. Even well-designed random trials often encounter problems of compliance, retention, self-report reliability or loss to follow up, all of which can confound results.

The general consensus of major recent reviews is that treatment is effective for *some clients*, reducing alcohol and drug use and promoting improved social functioning, but that no single, clearly superior treatment approach exists.^{2,8,13,23} One recent large, uncontrolled follow-up study of alcohol treatment, conducted by Filstead,²⁴ reported 57% of adults interviewed one year after treatment were abstinent. Extrapolation to the full sample (only 66% of the original sample could be located) implied an abstinent rate of 42%. McLellan et al.²⁵ also reported impressive declines in drinking and intoxication among veterans six months after treatment.

Controlled trials have usually documented lower abstinence rates. One recent study by Kelso reported an abstinent rate of approximately 15% during the first year post-treatment. In their long-term follow-up study of 1,300 alcoholics, Helzer et al.²⁶ reported 15% of the clients interviewed were abstinent at two-year follow-up, while 5% were occasional drinkers. Walsh et al.²⁷ recently reported abstinence rates in the range of 30% - 60% (one-year follow up) among alcohol abusing workers referred to treatment.

Reviews of the alcohol literature^{2,7,14,23} suggest that for the "average client" treatment often has modest effects, but for some clients it may be quite effective. Recognizing this, researchers have focused attention on determining strategies that can be used to better match clients with specific treatments, and considerable research in this area is now underway.²⁸⁻³⁰

The field of drug treatment has had fewer studies and less rigorous evaluation. Much of what is known about treatment outcomes comes from national epidemiologic studies. The Drug Abuse Reporting Program (DARP), which included over 40,000 clients admitted to treatment during 1969 - 1973, was the first such study, and yielded a wealth of information on treatment outcomes.^{10,31-34} In general, results showed improved outcomes for clients in methadone maintenance, therapeutic communities, and drug-free outpatient programs. For example, daily use of opioid drugs declined pre- to post-treatment

(one year) from 100% to 39% and from 100% to 60% among clients treated in therapeutic communities and drug-free outpatient programs, respectively.

The second major epidemiologic study, the Treatment Outcome Prospective Study (TOPS), involved over 10,000 clients admitted to treatment during 1979 - 1981. Detailed follow-up analyses conducted as part of this study also showed positive treatment outcomes with regard to reduced drug use and related measures (reduced criminal activity, employment, and drinking).⁸ Clients who stayed in treatment (methadone maintenance and therapeutic communities) had significantly better outcomes than clients who dropped out of treatment, but it is unclear whether these outcomes resulted from the treatment itself or from unmeasured factors, such as client motivation. The third national follow-up study, the Drug Abuse Treatment Outcome Study (DATOS), is now underway. Information from this study, when available, will further strengthen our knowledge base.

The most extensive outcome evaluations from a single program come from Phoenix House in New York. De Leon et al. reported significant reductions in drug use among clients, with program graduates experiencing the most favorable outcomes.³⁵ These findings are consistent with the earlier findings of McLellan et al.,²⁵ who reported better outcomes among veterans staying in treatment longer. While encouraging, these findings must be viewed with caution because of the inherent limitations of uncontrolled studies.

Employment Outcomes

While reducing alcohol and drug use will always remain the central goal of treatment, fostering increased economic independence is considered an important secondary objective. Because employment is correlated with other outcomes,³⁶⁻⁴¹ including alcohol and drug use, it provides a useful indicator of client functioning.

Substance abuse treatment appears to have a positive effect on employment. Results from the DARP¹⁰ study and from TOPS⁸ showed favorable gains in employment status following treatment. For example, among DARP clients treated in therapeutic communities and outpatient drug-free programs, the percentage employed for at least six months during the year following treatment as compared to the year prior to treatment increased from 20% to 61% and from 24% to 52%, respectively.⁴² The TOPS obtained similar results. Clients spending a year or more in residential treatment were 2.7 times more likely to have full-time employment during the year after treatment than clients who received only brief treatment.⁸ In an effort to reduce the possibility of confounding, French et al.⁴³ analyzed TOPS data using a statistical model that sought to "adjust" for unmeasured external factors. This model used a means-differencing technique to "difference out" the effect of external factors. The analysis revealed the same general pattern of findings; that is, length of

treatment was positively related to both post-treatment earnings and length of employment.

Other studies of clients in both alcohol and drug treatment have generally shown positive effects of treatment on employment. McLellan et al.²⁵ found that among both alcohol and drug clients employment outcomes (earnings and time employed) improved after treatment. Similarly, Waldo and Gardiner⁴⁴ found improved employment outcomes during the six-month period following treatment, especially among clients who received outpatient treatment following inpatient treatment.

There are several methodological points regarding employment outcome studies worth noting. First, employment *prior* to treatment has been identified as a key factor influencing earnings and employment *after* treatment. Yet not all studies control for pretreatment employment. Since pretreatment work history is likely to be correlated with compliance, and thus with length of treatment, failure to control for it may lead to biased results.

Second, most studies conducted to date have been able to explain less than 20% of the variance in post-treatment employment, suggesting there are important factors affecting employment that have yet to be identified and analyzed. Third, studies vary considerably in how they define pretreatment for purposes of analyzing employment outcomes. Some define it as a year prior to treatment, others six months, and still others one month. At least one study noted a marked decline in employment just prior to treatment.⁴⁴ Studies that restrict baseline to the period immediately before treatment (e.g., one to three months) may, in effect, inflate pre- to post-treatment changes in employment, and thus exaggerate treatment's actual effect on employment. (By defining baseline as the 12-month period prior to treatment, the current study avoids this problem.)

Effects of Type and Duration of Treatment

A key objective of this study is to assess whether different types of treatment (inpatient versus outpatient) or duration of treatment influence outcomes. The question of whether longer or more intense treatment leads to better outcomes has been an important topic of research in the alcohol field. Although findings are not definitive, the weight of evidence suggests that longer or more intense treatment *does not* produce better outcomes *on average*.^{2,45-49} In their recent review of the literature on alcohol treatment cost effectiveness, Holder et al.⁵⁰ found little relationship between the cost of treatment (duration and intensity) and outcomes.

There are, however, exceptions to these findings. For example in their recent clinical trial, Walsh et al.²⁷ found that clients receiving only limited outpatient treatment had more problems with continued drinking and required

more frequent hospitalization than clients receiving more intense inpatient treatment. A number of uncontrolled studies have also shown positive effects of length of treatment, but these findings must be viewed with caution. Much of the evidence concerning the effectiveness of brief interventions comes from studies of stable independent clients.^{2,4} Such interventions may be less effective in treating unstable clients with more severe drug or alcohol problems.

II. METHODS

Treatment Setting

In 1987, Washington enacted the Alcoholism and Drug Addiction Treatment and Support Act (ADATSA), which established a program of treatment for indigent, unemployable chemically dependent persons as a constructive alternative to maintaining these persons on public assistance. A maximum of six months of treatment and financial support is provided in any two-year period through the ADATSA program. Clients must first establish financial eligibility for the program through local welfare offices. If a client is found to be financially eligible, he is then referred to a local assessment center for diagnostic evaluation. If found to be chemically dependent and unemployable due to the addiction, the client is then referred for treatment.

The primary goal of the ADATSA program is abstinence. Ancillary goals include improved personal coping skills, vocational skills and social skills. Success in achieving these goals is expected to result in improvements in reaching the long-term goal of self-sufficiency. Employment and reduced use of public assistance are important aspects of the goal of self-sufficiency.

Treatment usually consists of residential treatment followed by outpatient treatment. ADATSA provides support for different treatment modalities, including (non-hospital based) intensive inpatient treatment, long-term residential treatment, recovery house, extended recovery house, and outpatient (not methadone) treatment. Intensive inpatient treatment consists of either 21 or 28 days of inpatient therapy in highly structured settings. Recovery house is intended to provide follow-up inpatient care after intensive inpatient treatment and focuses on social, recreational and occupational skill building. Extended care recovery house provides these same services to persons with more serious chemical dependency problems or with mental impairment. Long-term treatment is a specialized program for drug addicts who require periods of treatment in excess of 90 days. Outpatient treatment consists of a variety of diagnostic and treatment services, including vocational services, provided according to a prescribed treatment plan in a nonresidential setting.

The typical continuum of treatment recommended consists of intensive inpatient treatment, followed by residential support services (recovery house) and then outpatient treatment. But clients do not always follow this treatment sequence. For example, some clients with less severe dependency problems

may be referred directly to outpatient treatment or to non-intensive residential (recovery house) treatment. Also, if there are no available intensive inpatient treatment slots at time of referral, a client may be placed on a waiting list. If the client needs immediate treatment, he may seek alternative care, such as outpatient treatment or recovery house care. The earlier ORDA study documented a wide range of pathways used by clients to obtain treatment.

Study Population

The study population consists of clients randomly selected from the population of clients referred for assessment between August 1 and November 30, 1989 and found eligible for treatment under ADATSA guidelines. A stratified sampling technique was used by ORDA to ensure the sample selected would be representative of Washington's overall ADATSA treatment population.

The database provided for this study included information on 864 clients. Eighty-eight clients (10.2%) were dropped from the analysis: 50 for incomplete or suspect data; 16 because they had severe mental problems; and 27 because they were either too old (over 55) or too young (under 17). In addition, we excluded 109 clients from the analysis who were on Aid to Families with Dependent Children (AFDC), because at the time of the study employment was viewed as a less important short-term goal for AFDC clients than for other ADATSA clients. The main goal of treatment for AFDC clients was to address alcohol and other drug problems and to improve the client's ability to provide a reasonably safe and stable living environment for children in the home.

All of the remaining 667 clients were included in this analysis. Descriptive information on these clients is provided in Table 1. Seventy-one percent of the clients were male. Sixty-nine percent were white, 18% were black, and 9% were Native American. Approximately 47% of the clients had a high school education; 10% had some education beyond high school. Thirty-eight percent of the clients had a disability unrelated to their drug or alcohol use. Twenty-four percent were either homeless (8.3%), living in a shelter (13.7%), or residing in a single room occupancy hotel (2.1%). Nearly all of the clients had had some prior involvement with the law: 77% had at least one previous arrest, while 27% had been convicted of a crime and were currently on parole. Forty-one percent of the clients abused primarily alcohol, 25% abused other drugs, and 34% abused both. Eighty-six percent of the clients were judged at assessment to have a severe drug/alcohol dependency problem.

Table 1
Selected Characteristics of Study Populations
(n = 667)

	Percent or Mean (SD)
Sex	
Male	71.1%
Age	32.6 (8.5)
Education	
Less than High School	43.1%
High School	46.6%
Past High School	10.3%
Race	
White	69.2%
Black	17.7%
Native American	8.9%
Other, Non-white	4.2%
Number of Disabilities (not drug/alcohol related)	
None	62.3%
One	29.9%
Two	5.7%
Three and more	2.1%
Living Arrangement	
Homeless/on street	8.3%
Shelter/public mission	13.7%
Single room occupancy hotel	2.1%
Alone, apartment/house	22.6%
Living with family	29.2%
Other unrelated household	24.1%

Table 1
(Continued)

	Percent or Mean (SD)
Family History of Mental Illness	14.6%
Ever Arrested ^a	77.2%
Currently on Parole	27.4%
Age at First Use	17.4 (8.1)
Primary Substance Abused	
Drugs only	25.0%
Alcohol only	40.9%
Drugs and alcohol	34.1%
Dependency Status ^a	
Severe dependency	86.2%
Moderate dependency	12.3%
Mild dependency	1.5%

^a The judgment of dependency status was made by the assessment intake counselor based upon information gathered at time of assessment.

Data and Measures

Data

The data furnished by ORDA for this study included: (1) data on employment and earnings obtained from the Washington State Employment Security Office, (2) personal client information obtained from assessment center files and records, and (3) treatment information provided by the programs and by DASA's management information system. Employment and earnings data were obtained by ORDA through matching clients' names and social security numbers against Employment Security records. Of the 667 clients analyzed, 121 (18%) could not be matched.

It is possible that some clients with no record of employment moved out of state or worked in jobs that did not require the reporting of earnings to the state, e.g., farm labor jobs or casual temporary employment. For purposes of the

analysis, we assumed that clients who could not be matched were unemployed and thus had zero earnings. This assumption is reasonable and consistent with collateral information that was available on clients. For example, the great majority of clients who could not be matched did have Medicaid claims indicating they resided in Washington.

The second data source, assessment center records, provided information on clients' personal characteristics, e.g., age, education, ethnic group, primary substance abused, prior arrests, mental health status, type and frequency of drug use, prior treatments, and severity of dependence. Data for a selected set of variables were abstracted by research staff of the prior ORDA study, coded, and entered into the ORDA database.

Information on type and length of treatment was obtained by ORDA from program records and from DASA's management information system. Despite their concerted efforts, ORDA research staff were unable to obtain complete and accurate treatment information on all clients. We used collateral information on treatment payments available in the ORDA database to verify the original treatment data and to update selected records where information was either missing or judged to be incorrect based on edit checks. Approximately 15% of the records were updated in this fashion.

Measures

Three types of measures were analyzed: (1) outcome variables on employment, (2) treatment variables (the independent variables of interest), and (3) covariate factors, e.g., prior employment, mental health status, education, living arrangement, ethnic status, and prior treatment.

Employment Measures

Information on earnings was used to construct several outcome measures. These included:

- average monthly earnings
- percent of quarters in the follow-up period in which the client had some positive earnings
- a binary variable defined as 1 if the client had earnings equal to the level of public assistance payments (approximately \$350 per month) and zero otherwise (referred hereafter as substantive employment)
- percent of quarters in the follow-up period in which the client achieved substantive employment

Earnings were based on nominal dollars. Given the limited period spanned by the analysis, adjusting the earnings data to reflect real dollars would have had little meaningful effect.

Treatment Measures

The analysis includes three key treatment measures:

- primary modality
- duration of treatment
- continuum of care

Primary modality (the modality to which the client was initially referred) was measured in binary form. Two major modalities were analyzed: intensive (non-hospital) inpatient treatment (< 30 days) and outpatient (not methadone) treatment. A small percentage of clients received long-term residential treatment. These clients were combined in the analysis with clients receiving intensive inpatient treatment. Recovery house is not a primary modality to which clients are normally referred after assessment but some clients did follow this treatment pathway (clients may have needed immediate treatment and all intensive inpatient treatment slots may have been full). Hence, recovery house was included in the modality analysis.

Treatment duration was measured as follows: total inpatient days; total outpatient days,^b defined as the elapsed time between admission and last treatment activity; and total treatment days (the sum of inpatient and outpatient days). Continuum of care was assessed through a set of binary variables representing the following treatment conditions: 1) early drop out from treatment, 2) primary phase of treatment completed, and 3) full continuum of treatment completed. The comparison group consisted of clients who underwent assessment but who did not initiate treatment.

Descriptive information related to the above treatment measures is shown in Table 2. The principal treatment modality was intensive inpatient, which accounted for 60.2% of the clients receiving treatment. Outpatient treatment accounted for 22.8% of the clients. Twenty-six percent of the study population (n=667) represented clients in the comparison group. Twenty-seven percent of the clients completed the full continuum of treatment, 24% completed the initial phase of treatment, and 23% dropped out before completing the initial phase of treatment. Clients referred for inpatient treatment received, on average, 37 days of inpatient treatment, those referred for outpatient care received 73 days of treatment.

^b It would have been desirable to measure outpatient treatment duration by the number of activities or sessions in which the client participated, rather than the number of days. Unlike residential treatment, clients do not participate in daily outpatient treatment activities. However, data on outpatient activities were unavailable, so we used outpatient days as a proxy measure for treatment exposure for outpatient clients.

Table 2
Treatment Modalities and Measures
(n = 667)

	Percent or Mean (SD)
Primary Modality (n=499)^c	
Outpatient	22.8%
Recovery house	9.5%
Intensive inpatient	60.2%
Long term residential	7.8%
Treatment/Comparison Groups (n = 667)	
Completed primary & secondary phase	27.0%
Completed primary phase only	23.7%
Dropped out of primary phase	23.2%
Untreated Comparison group	26.1%
Mean Duration of Treatment (n = 499)^d	
Inpatient days	36.6 (33.4)
Outpatient days	73.0 (50.3)

^c Although 9.5% of the clients were referred to recovery house, this modality is not usually viewed as a primary treatment modality. More often, clients receive follow-up care in recovery house after receiving intensive inpatient treatment.

^d The analysis combined clients in intensive inpatient and long term residential treatment. The figure shown for mean inpatient days includes these two client groups. Mean outpatient days is based on clients referred to outpatient treatment as a primary modality. It does not include outpatient days provided as aftercare following inpatient treatment.

Covariate/Risk Adjustment Measures

A number of factors, in addition to treatment, may affect employment outcomes, including education, ethnicity, prior employment, mental health status, and severity of addiction. If these factors are related to the type or duration of treatment received, they may confound the analysis. In studies where random assignment is not feasible, it is necessary to control for covariate factors through statistical analysis. Information available in the ORDA database allowed us to control for the following factors: pre-treatment employment, education, gender, living arrangement, severity of dependency, marital status, primary drug of abuse, past treatment, number of disabilities unrelated to substance abuse, ethnic status, age and age at first use, and mental health functioning (see Appendix).

Analytical Procedures

Two types of analyses were performed: *descriptive analyses* of employment and earnings over time and *multivariate analyses* of employment outcomes. The latter analyses allowed us to assess employment outcomes while controlling for differences in client factors (see appendix). In brief, two multivariate statistical models were estimated: a multiple linear regression model and a logistic regression model. The multiple regression model was used when outcome variables were measured continuously, e.g., average monthly earnings and percent quarters employed. The logistic regression model was used to analyze the binary variable representing substantive employment (any versus no substantive employment).

Before presenting the results of the analysis, it is useful to note the study's methodological strengths and limitations to help place the findings in perspective. First, the size of the study population (approximately 670) and the fact that clients received treatment in different settings and programs enhance the generalizability of the findings. Second, because the employment and earnings information were obtained from official state records, the outcome data analyzed have good reliability. By using data from official state records, we avoid the problem of loss to follow up, which can introduce serious bias if case attrition is high. Third, the extended period covered by the analysis, 12 months pretreatment and 18 months post-treatment, enhances the reliability of the study's estimates. Since earnings usually decline immediately before treatment, studies that use short baseline periods may exaggerate the actual change in earnings associated with treatment. Using restricted follow-up periods (less than one year) may also introduce reliability problems if the earnings of clients vary over time.

The major limitation of the study is its reliance on non-experimental data. Because clients were not randomly assigned to treatment or comparison groups, the analysis may be confounded by unknown selection bias. Although we were able to control for a number of factors, most importantly pre-treatment employment, unmeasured factors may still influence the findings. Thus, appropriate caution should be used in interpreting the results presented below.

III. RESULTS

Descriptive Analyses

Employment and Earnings Prior to Assessment

There was considerable variability over time in average monthly earnings as well as in the percentage of clients employed. Figure 1 shows the average monthly earnings during the 12-month pretreatment period. Note the figure includes data on two groups of clients: (1) all clients (n = 667) and (2) clients who had some reported earnings during the 30-month observation period (n = 546). The "all client" group includes 121 clients who had no reported income and who were assumed to be continuously unemployed. The second group includes only clients who had some labor force participation as indicated by having reported earnings *in at least one quarter*. Although earnings declined throughout much of the 12-month period, this decline became more pronounced in the last few months prior to assessment. The average monthly earnings for the "all client" group 12 months before assessment was \$196 but only \$74 the month before treatment. Restricting the analysis to clients with reported earnings increases the monthly income figures by approximately 10% - 20%. The observed decline in earnings may reflect, at least in part, the destructive effects of alcohol and other drug dependence.^e

^e The earlier ORDA study converted quarterly earnings to monthly earnings to minimize distortions that arose in the data because clients' starting and ending dates of treatment did not always align with the calendar quarter, which was the basis for reporting the earnings data. However, this conversion led to underestimates of actual earnings for some clients in the month or two prior to treatment as well as the first month or two following treatment (depending upon how the start and end of treatment aligned with the calendar quarter). It was not feasible to adjust the data to account for this. As shown in Figure 3, the *percent* of clients employed just prior to treatment declined markedly, indicating that the decrease in earnings resulted mainly from clients dropping out of the labor force.

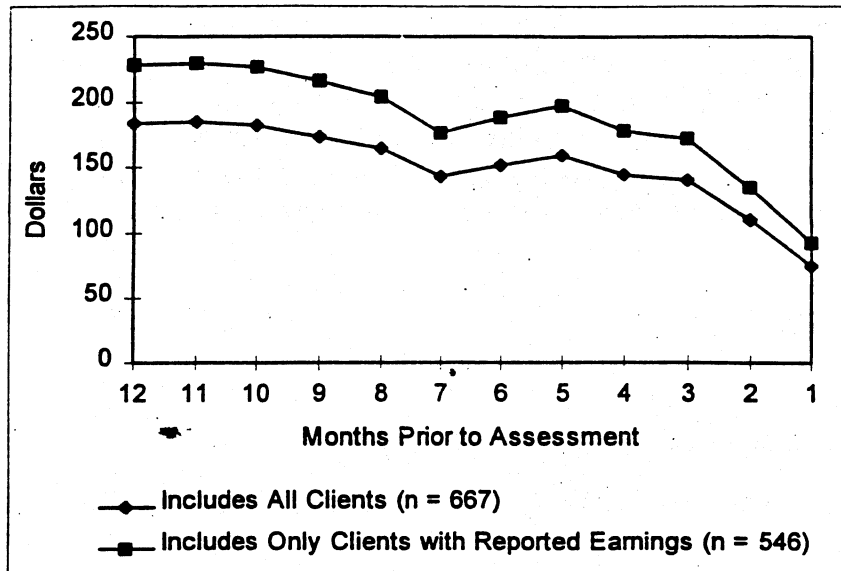


Figure 1: Average Monthly Earnings Prior to Assessment

Figure 2 shows monthly earnings over the baseline period for clients with severe versus moderate or mild dependency.^f Clients with severe dependency had substantially lower earnings throughout the pre-treatment period than clients with moderate or mild dependency and experienced a larger relative decrease in earnings. Thus it appears the severity of dependency had an important effect on pre-treatment earnings.

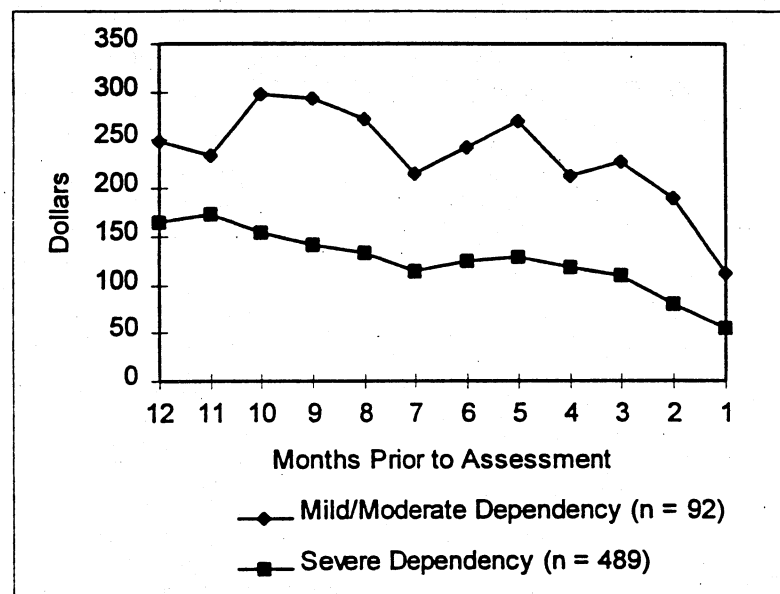


Figure 2: Average Monthly Earnings Prior to Assessment by Dependency Status

^f Severity of dependence reflects the subjective judgment of the assessment counselor.

Figure 3 shows the percentage of clients employed each month during the baseline period. The month-to-month variability in earnings was modest, except for the two months preceding assessment. Twelve months before assessment 31% of all clients and 39% of clients who were labor force participants were employed. One month prior to assessment, only about one in five clients were employed.

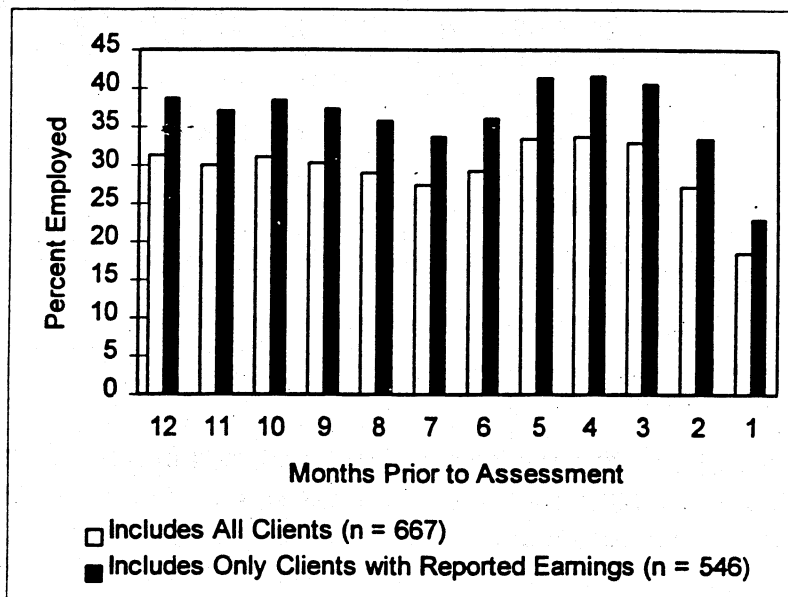


Figure 3: Percent Employed Prior to Treatment

In sum, one observes a general pattern of declining earnings in the period prior to assessment. The percentage of clients employed each month declined less. This may suggest that although clients continued to work, they worked less and hence earned less. Clients with more severe dependency earned less than other clients and experienced a greater relative decline in their earnings.

Employment and Earnings After Treatment

Figures 4 - 8 provide information on earnings and employment in the 18-month period after treatment. Figure 4 shows the percentage of clients employed during selected (even numbered) months following treatment. For comparison purposes, the average percentage of clients employed in the pre-treatment period (29%) is also shown. Among the "all client" group, the percent clients working remained fairly stable, with approximately 33% employed.

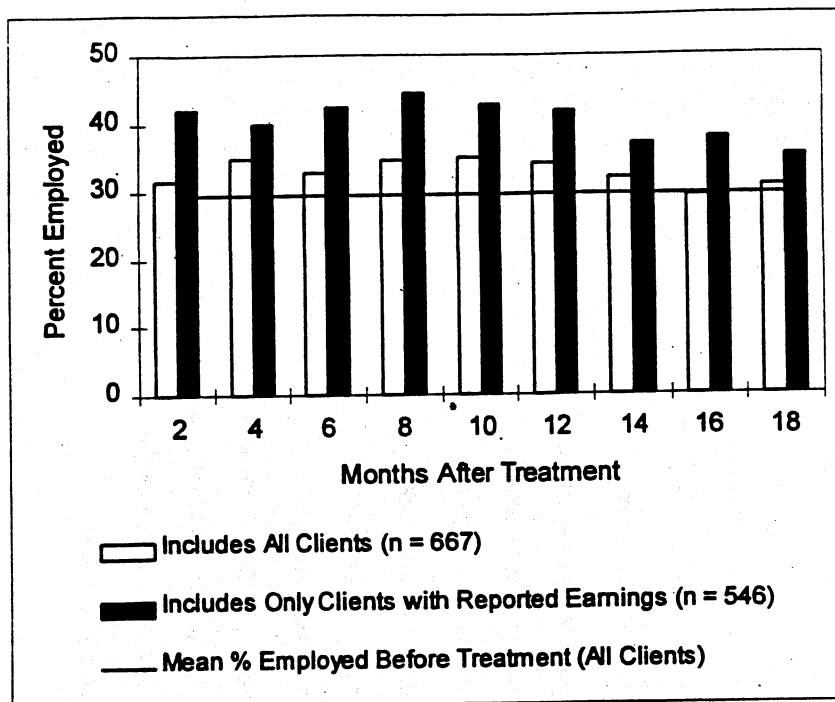


Figure 4: Percent Employed After Treatment

Figure 5 shows the average monthly earnings in the post-treatment period for all clients and for clients with reported earnings. The figures show modest variability in monthly earnings, with both increases and decreases. Monthly earnings were greater than the pre-treatment average of \$153 (for all clients) in every month.

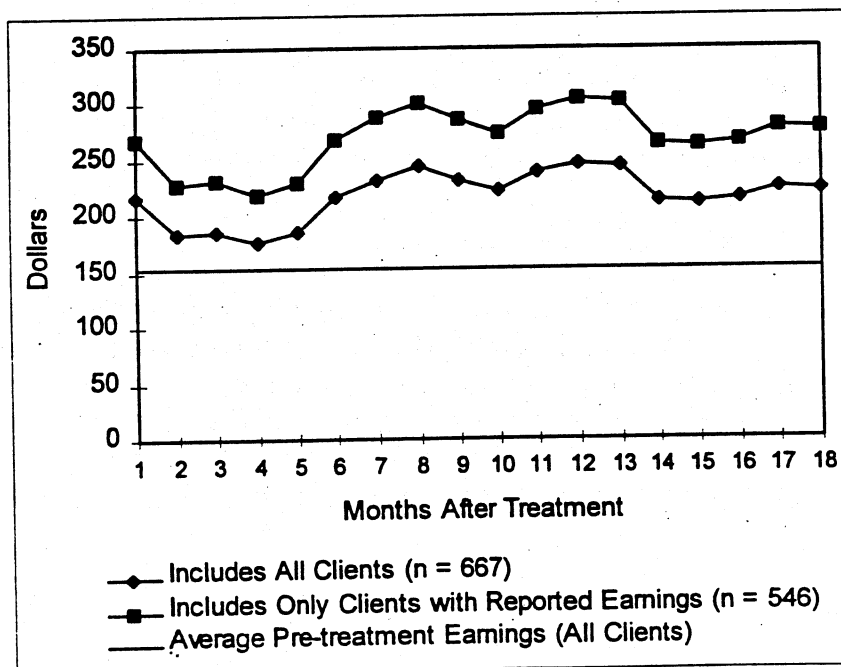


Figure 5: Average Monthly Earnings After Treatment

Figure 6 shows the percent of all clients (n = 667) employed during selected months after treatment for the treatment and comparison groups. Clients who received treatment were better able to gain employment. On average, the employment rate was approximately 40% to 65% higher for treated clients. For example, 23% of the clients in the comparison group were employed in month two, compared to 38% of the clients in the treatment group. Six months later, the same percentage of comparison-group clients were employed, while 40% of the clients in the treatment group were employed.

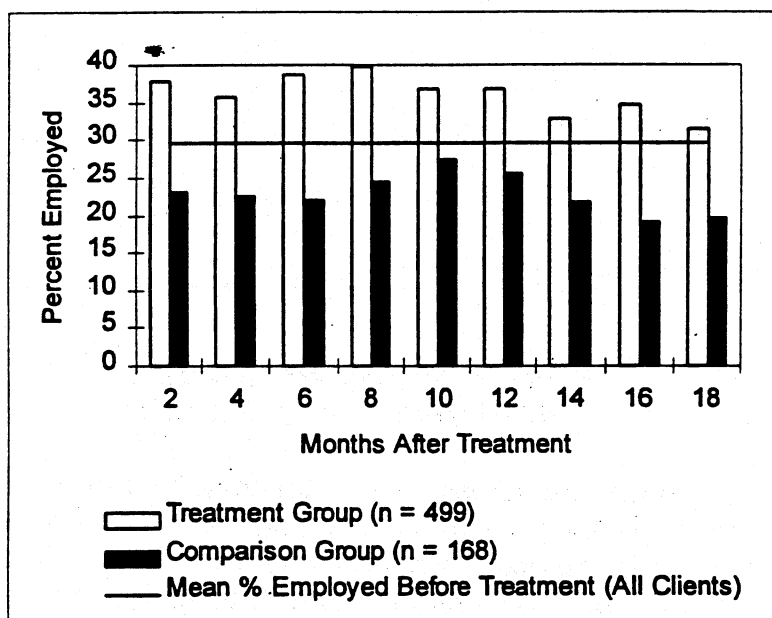


Figure 6: Percent Employed After Treatment, Treatment versus Comparison Group

Figure 7 provides earnings data for the following groups: 1) clients who completed the full continuum of treatment; 2) clients who completed only the primary phase of treatment; 3) clients who dropped out of treatment prior to finishing the primary phase; and 4) comparison-group clients who did not receive treatment. As shown, comparison-group clients had the lowest average earnings, roughly \$100 per month. Clients completing some or all of the primary phase of treatment had substantially higher earnings; clients completing the full continuum of treatment had the highest earnings in all but four months. As the figure shows, the average earnings of clients in each of the three treatment groups were substantially above the average overall pre-treatment earning level (\$153). In contrast, the comparison group had earnings below the pre-treatment level.

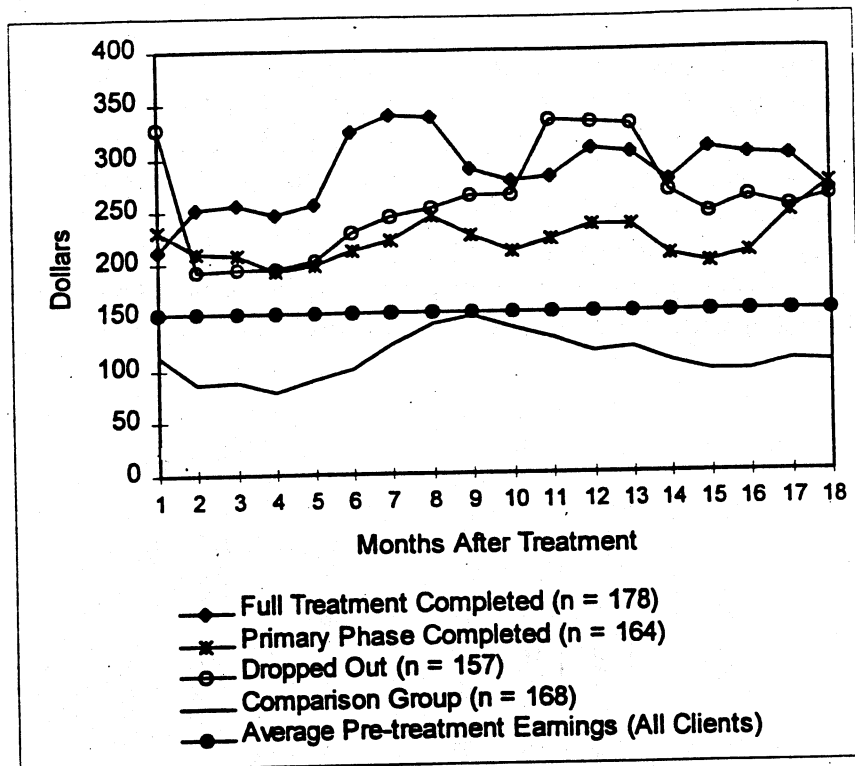


Figure 7: Average Monthly Earnings for Different Treatment Groups

Figure 8 shows the percentage of clients within the same four groups that achieved substantive earnings (defined as the level of earnings equal to public assistance payments, approximately \$350 per month). In general, the same pattern shown in Figure 7 is observed: untreated clients in the comparison group fared the least well in achieving substantive employment levels, clients who completed at least some treatment did better, while clients who completed the full continuum of treatment did better yet. For example, by six months after treatment 34% of the clients who completed the full continuum of treatment were substantively employed. In contrast, less than 20% of the clients in the other two treatment groups were substantively employed. Only 12% of the comparison-group clients achieved substantive employment. By 18 months, only 10% of the clients in the comparison group were substantively employed, compared to 25% of the clients who completed the full continuum of treatment.

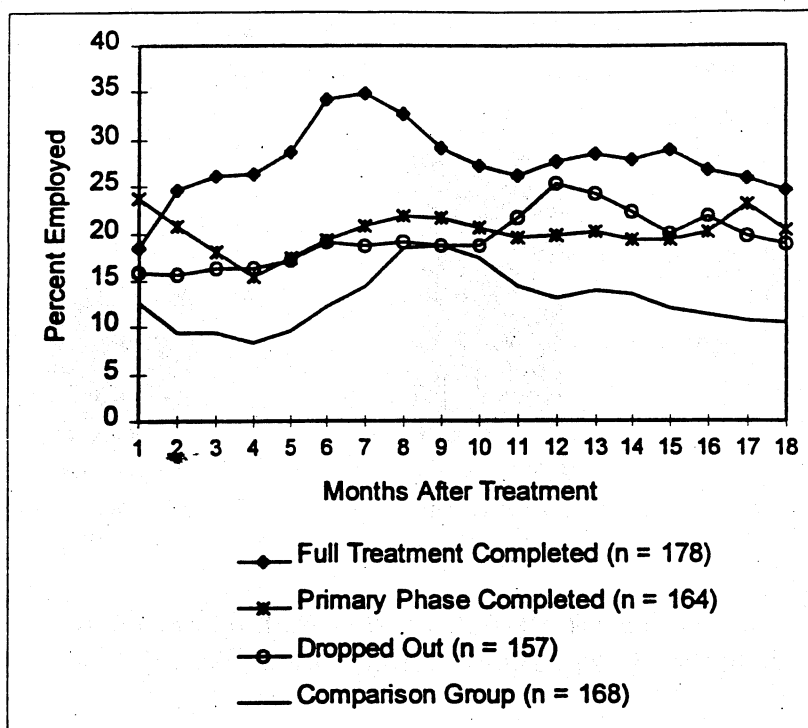


Figure 8: Percent of Clients with Substantive Employment²² After Treatment

- Percentages based on clients with positive earnings.
- ²² Clients earning \$350 per month, the level of public assistance, were defined as being substantively employed.

Gaining economic independence was a difficult goal for clients to achieve. It should be remembered that in order to qualify for ADATSA clients had to be addicted and certified as unemployable at time of assessment because of their addiction. The levels of employment and earnings shown in the above figures reflect the many obstacles these clients faced in gaining economic independence. The data represent averages, which tend to be low because many clients had little or no earnings. But this is not true of all clients. Figure 9 shows monthly earnings of clients at the 75th percentile of the earnings distribution. As shown, clients completing the full continuum of treatment had earnings of \$629, as compared to \$344 for clients in the comparison group.

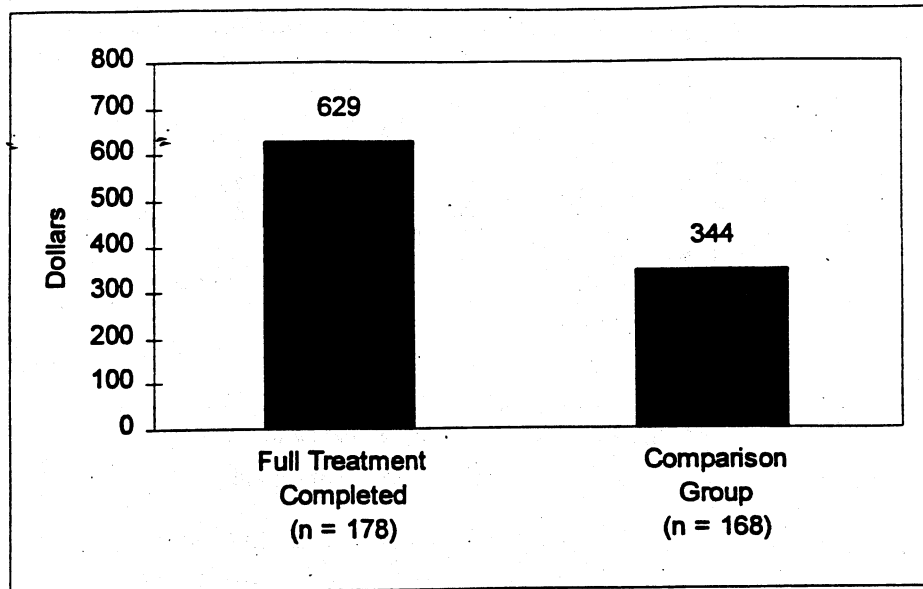


Figure 9: Post-treatment Monthly Earnings for Clients at the 75th Percentile of the Earnings Distribution

The data presented thus far are not adjusted to reflect differences in clients' pretreatment employment experience or in other factors. To gain a more accurate picture of employment outcomes related to treatment, adjustment for these factors needs to be made through multivariate analyses.

Multivariate Analyses

We performed a series of statistical analyses to assess employment outcomes in relation to treatment. Abridged results of these analyses (the estimated regression coefficients and t-statistics) are shown in the appendix for the relevant treatment variables. The findings presented in the main body of the report are shown in graphical form or are summarized in the narrative. Note the multivariate analysis was performed on all clients, which included clients with zero reported earnings.

Employment Outcomes for Primary Modality

The first set of analyses involved assessment of employment outcomes for clients in different modalities. We examined the effects of three different modalities, outpatient treatment, intensive (non-hospital) inpatient treatment, and recovery house (see page 12 for definition of these modalities) by estimating separate regression equations for each of these three modalities. These analyses did not consider the duration of treatment or whether clients completed treatment. (Other analyses estimated the effects of these factors.) Modality was coded as a binary variable where 1 represents the modality and 0 represents the

comparison group. The regression coefficients (shown in Table A-1 in the appendix) provide estimates of the effects of modality controlling for client factors.

Compared to untreated (comparison-group) clients, clients in all three modalities showed improved employment outcomes. The average outpatient client was twice as likely to achieve substantive employment and had estimated monthly earnings that were \$104 greater than the average comparison-group client. Clients referred to intensive inpatient or recovery house treatment also had significantly higher post-treatment earnings relative to comparison-group clients, but the differences were of smaller magnitude. Monthly earnings of intensive inpatient and residential inpatient clients were, on average, \$63 and \$56 greater, respectively, than earnings of comparison-group clients. Intensive inpatient clients also were employed in a greater percentage of quarters than comparison-group clients.

These results regarding modality effects should be interpreted somewhat cautiously. ADATSA clients are referred for treatment based on their assessed treatment needs. Clients referred for inpatient treatment differed from those referred for outpatient treatment on measured factors, and may have differed on unmeasured factors as well. For example, clients referred to outpatient treatment were more likely to have a high school degree or post high school training, were less likely to have both drug and alcohol dependency, and were somewhat less likely to be severely dependent than clients referred to inpatient treatment. Favorable selection of lower risk clients referred to outpatient treatment may explain the differences in employment outcomes.

Employment Outcomes Related to Duration of Treatment and Continuum of Care

The relationship of employment to length of time in treatment was examined through two types of analyses. First, we analyzed whether the duration of inpatient or outpatient treatment was related to proportion of time employed, to earnings, or to the likelihood of clients becoming substantively employed. Second, we examined whether the continuum of treatment provided to clients affected employment or earnings. We did this by analyzing comparison-group clients in relation to clients in three treatment categories: 1) clients who completed the full continuum of treatment, 2) clients who completed

only the first phase of treatment, and 3) clients who dropped out of treatment early.⁹

These analyses were performed on data representing clients referred to the two major treatment modalities, intensive inpatient and outpatient treatment. Separate regressions were estimated for the inpatient and outpatient analyses.

The effects of time in treatment may be influenced by whether clients completed treatment. To control for this, we included in the inpatient time-in-treatment equations a variable representing treatment completion. Including the treatment completion variable in the outpatient analysis, however, was not feasible because length of treatment for outpatient clients was highly correlated ($r = .87$) with treatment completion. Thus, the statistical models used for the inpatient and outpatient analyses were not the same, and this fact should be kept in mind in interpreting the results. We should note a further caveat. As discussed in the footnote on page 12, outpatient treatment is not as well defined as inpatient treatment because the treatment activities received by clients differ in their intensity and duration. In short, the outpatient analyses may be subject to more measurement error than the inpatient analyses, and the results of the outpatient analyses are therefore more uncertain in their interpretation.

Our working hypothesis was that clients who received more treatment or who received treatment representing the full continuum of care would achieve better employment outcomes, other things equal. This hypothesis was supported by the findings.

Length of treatment was related to employment outcomes for clients in both intensive inpatient and outpatient treatment, but the magnitude of the effect was somewhat greater for inpatient clients (see Table A-1 in appendix). The analysis implies that for every 10 days of inpatient treatment (intensive inpatient and residential follow-up support care) the average client earned \$13 more per month. The average outpatient client earned \$10.40 more per month for every 10 days in treatment.

To illustrate the effects of length of stay further, consider a "typical" client (i.e., a client whose characteristics represented those of the average client) who received 60 days of residential care (30 days of intensive inpatient treatment followed by 30 days of care provided in a recovery house setting). The monthly earnings of this "average" client compared with the same client who received no treatment is shown in Figure 10. For every day of inpatient care received, earnings increase, on average, by \$1.30, other things equal. Thus 60 days of

⁹ This analysis was modified for clients in outpatient treatment, because the notion of a full continuum of care is not relevant for outpatient clients. For the outpatient analysis, we eliminated the second treatment category (clients who completed only the first phase of treatment). Thus, outpatient clients in categories #1 and #3 were compared with clients in the comparison group.

treatment would lead to an expected increase in earnings of \$78 per month, approximately 33% above the expected earnings (\$320 versus \$242 per month) of clients who received no treatment. Clients receiving outpatient treatment would also have expected higher earnings than clients who received no treatment, but the incremental gain per day spent in treatment would be less (\$1.04 per day as discussed above).

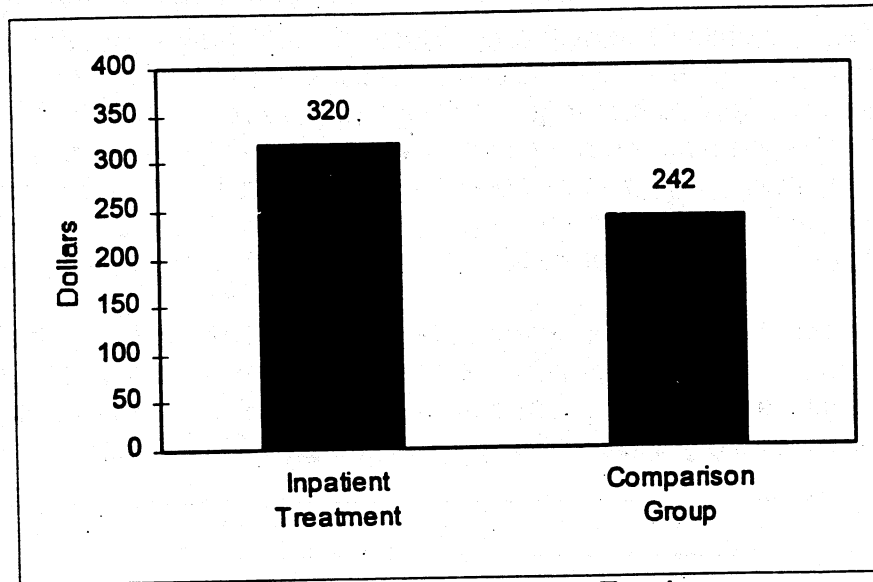


Figure 10: Adjusted Monthly Earnings Associated with Length of Treatment

Note: Predicted monthly earnings represent 30 days of intensive inpatient treatment followed by 30 days of care provided in a recovery house setting.

The odds of achieving any substantive employment during the post-treatment follow-up period also increased with length of time in treatment. For every ten days spent in inpatient treatment, the odds of becoming substantively employed in some quarter increased by approximately 12%. Thus, if a client stayed in treatment 30 days as opposed to 10 days his or her odds of becoming substantively employed were almost 25% higher. The odds associated with becoming substantively employed for outpatient clients were similar to those described above for inpatient clients.

Two important questions arise concerning the effect of length of treatment: 1) Does the effect of treatment vary with treatment duration, e.g., does treatment in the initial stage have a greater impact on outcomes than treatment received later? and 2) Over what range of treatment days are gains in employment realized? To address these questions, we constructed a statistical model that allowed the effect of treatment duration to vary over the range of observed treatment days. This was done by constructing a quadratic term for treatment days and re-estimating the inpatient and outpatient earnings

equations. Abridged results of these analyses are presented in Table A-1 in the appendix.

The analysis showed that the effect of both inpatient and outpatient treatment, measured in terms of days of treatment, was variable. In other words, the effects of treatment on earnings during the first 20 days were not the same as the effects during the subsequent 20 days. The results of the inpatient analysis are graphically depicted in Figure 11. As shown, inpatient treatment in the initial stage, the first 30 days coinciding with intensive inpatient treatment, had a greater effect on earnings than treatment received later. (The line plotted in Figure 11 represents predicted values generated by the coefficients of the variables inpatient days and inpatient days squared for a "typical" inpatient client.) But, as the figure shows, inpatient treatment received after the initial phase (recovery house treatment) also had a positive effect on earnings.

The results of the outpatient analysis are not shown graphically, although they are included in the appendix. In brief, the analysis showed that earnings increased with additional days of outpatient treatment, but the magnitude of this increase was less (by about a third) than for inpatient treatment.

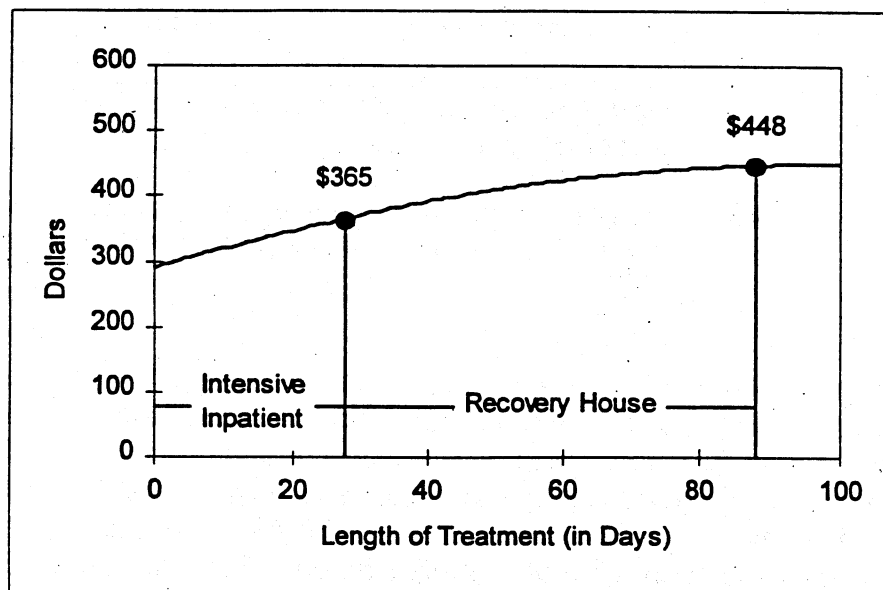


Figure 11: Change in Monthly Earnings Associated with Length of Inpatient Treatment

Another important question examined was whether clients receiving the full continuum of treatment had better outcomes than clients who completed only the first phase of treatment or who dropped out of treatment prior to completing the initial phase. This analysis showed that clients completing the full continuum of treatment achieved significantly better employment outcomes than comparison-group clients or than clients whose treatment was partially completed (see Table A-1 in appendix). These results held for both the inpatient and outpatient treatment analyses. Key findings from the inpatient analysis are

shown graphically in Figures 12 and 13. Clients completing the full continuum of treatment had employment in a greater percentage of quarters than clients completing only the primary phase of treatment or than comparison-group clients, 39% versus 32% and 30%, respectively (Figure 12). Clients completing the full continuum of treatment also earned significantly more than clients who completed only the primary phase of treatment or than comparison-group clients, \$403 versus \$310 and \$265, respectively (Figure 13).

Finally, we found that completing the full continuum of care significantly improved the odds of achieving some substantive employment during the follow-up period. Clients referred for intensive inpatient treatment who completed the full continuum of care were 2.2 times as likely to achieve substantive employment at some point during the follow-up period as were untreated clients (see Table A-1). The odds of achieving substantive employment were even greater for clients who completed the full course of outpatient care, but these results are not directly comparable to the results of the inpatient analysis because of the different method used to specify continuum of care.

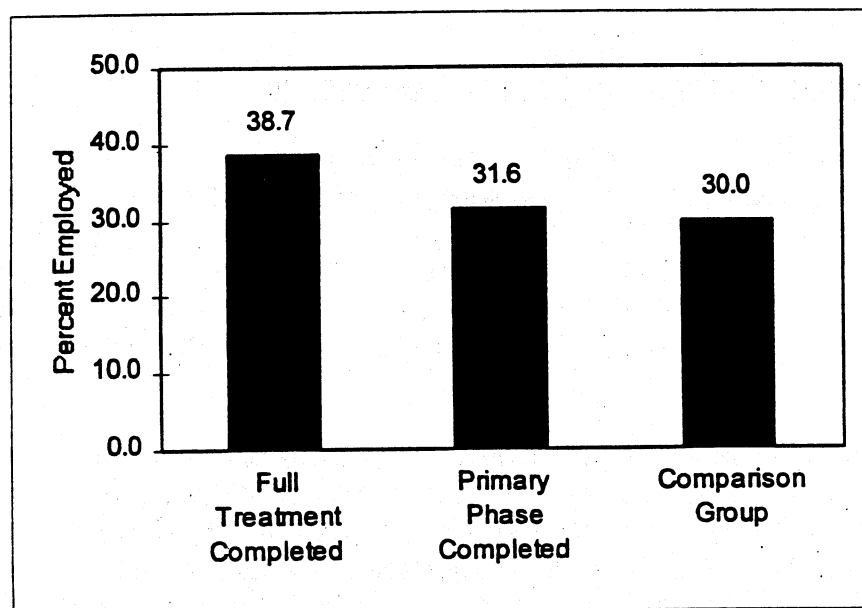


Figure 12: Adjusted Percentage of Quarters Employed for Selected Treatment Groups

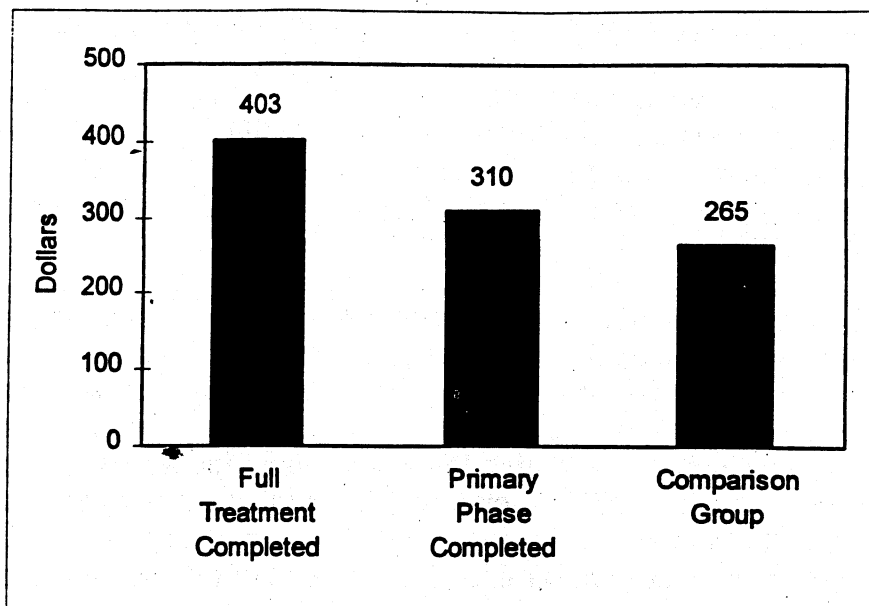


Figure 13: Adjusted Monthly Earnings for Clients Completing Full Continuum of Treatment versus Comparison Group

Employment Outcomes Related to Client Factors

Treatment may benefit certain groups of clients more than others, e.g., more educated clients or less severely dependent clients. To examine this question, we constructed statistical models that included interaction terms between treatment variables and different client variables. While some of the estimated coefficients of the interaction terms approached statistical significance, we found no evidence that treatment enhanced the employment prospects of some client groups more than others.

One of the variables included in the analysis as an interaction term was severity of dependency, whose finding merits brief discussion. The interaction term representing severity of dependency was not statistically significant. This "null" result implies that treatment benefited clients with more severe dependency as much as it benefited clients with less severe dependency.

That the coefficients of the interactive terms were not statistically significant does not indicate that client factors per se were unrelated to employment outcomes. Several client variables were found to be strongly and consistently associated with employment outcomes, independent of treatment variables. Males had better outcomes than females, older clients tended to have poorer outcomes than younger clients. Education was a strong predictor of both time worked and earnings. Clients with a high school education did significantly better than clients with less education, but clients having some post high school education, whether technical training or college, did even better. For example, controlling for treatment completion, monthly earnings of clients with a high

school education were, on average, \$75 more than clients without a high school education. But clients with education beyond high school earned \$165 more per month than clients without a high school education.

Other client factors were also found to be related to employment and earnings. White clients tended to work more and earn more than Native American or Black clients, independent of the type or duration of treatment they received or of other factors. Clients with disabilities unrelated to alcohol or other drug use exhibited poorer outcomes, as did clients who were perceived to have acute mental or psychological distress at time of assessment.

But the client factor of overwhelming importance was employment experience *prior to treatment*. This factor was the single most important predictor of post-treatment employment. From a methodological perspective, it underscores the need to control for prior work experience in assessing employment outcomes. It also highlights the potential importance of providing vocational services as part of treatment to assist clients in gaining the skills and work habits needed to enter the labor market and to obtain and hold jobs.

Importance of Client and Treatment Variables

As one aspect of this study, we sought to determine the relative importance of client versus treatment variables as predictors of employment outcomes. The incremental gain in variance explained by different groups of variables (incremental adjusted R^2) provides an indication of their relative importance in the model. We examined the relative importance of (1) client background variables (age, age at first use, dependency status, living arrangement, education, etc.), (2) pretreatment employment experience, and (3) treatment variables.

Among the different equations estimated, there was a high degree of consistency in the incremental percentage of variance explained by the three sets of variables. Client background variables usually accounted for approximately one-third (33%) of the variance explained in employment outcomes. The client pretreatment employment variable accounted for roughly 50% of the variance explained. Treatment variables accounted for the remaining portion of the variance explained, usually 12% to 18%. Thus, client-related variables and pre-treatment employment were considerably more important than treatment variables in explaining variance in employment outcomes.

The importance of treatment variables should be placed in perspective. The primary objective of treatment is not to enhance employment but rather to assist clients in overcoming their drug dependency. While treatment exerts a positive, independent effect on employment, its overall importance is modest when compared to other variables, especially pretreatment employment experience. Clearly, clients who have gained skills and acquired positive work

habits through prior employment are better able to obtain and hold jobs after treatment.

Costs and Outcomes of Treatment

Chemical dependency treatment provided to indigent clients through programs such as ADATSA represent a sizable investment of resources. This "investment" may yield benefits in the form of lower medical care costs, reduced use of public assistance, reduced criminal activity or greater economic independence afforded by employment. We explored this question by assessing the incremental gain in earnings associated with treatment in relation to the costs of treatment.

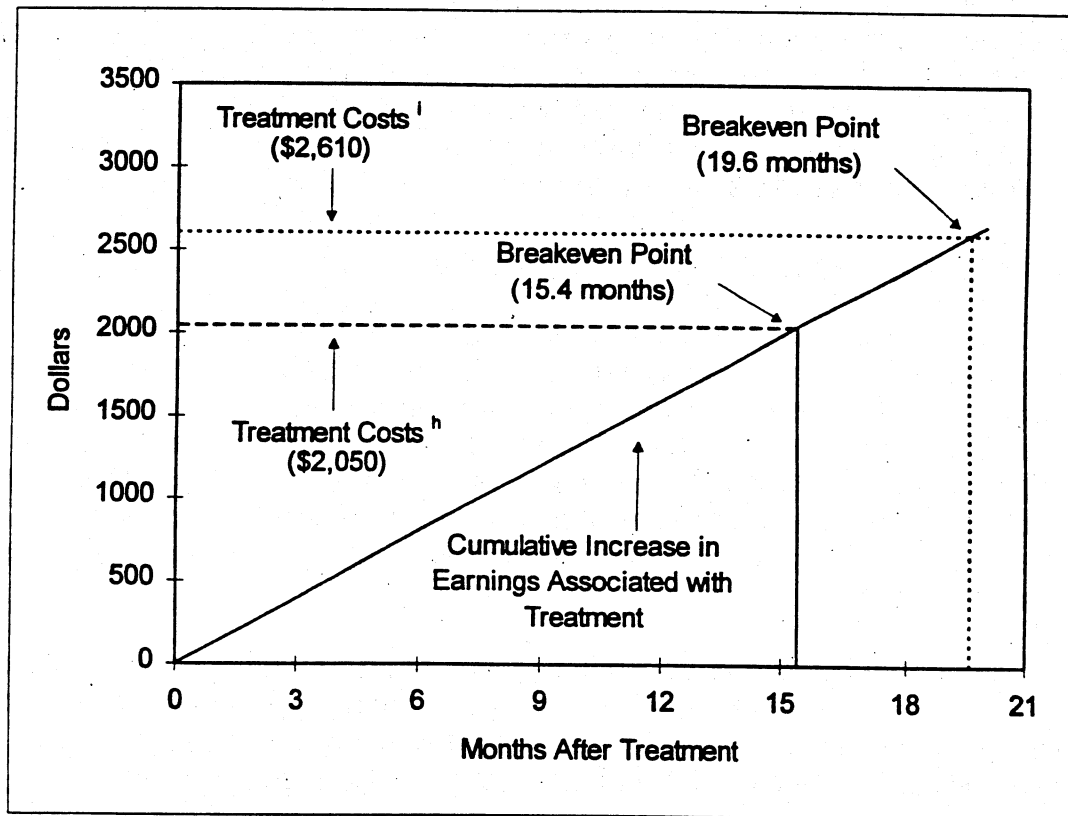


Figure 14: Estimated Earnings Compared with Treatment Costs

- ^h Costs represent 28 days of intensive inpatient care followed by 30 days of residential follow-up support care.
- ⁱ Treatment costs assuming the client relapses and reenters intensive inpatient treatment and stays and additional 14 days. This would increase costs from \$2,050 to \$2,610 and thus lead to a different break-even point, as shown in the figure.

The results of this analysis are summarized in Figure 14 for two scenarios, one where the client does not re-enter treatment and the second

where re-entry does occur. Based on the quadratic model whose results were shown in Figure 11, it was estimated that a client having 58 days of residential treatment (28 days in intensive inpatient treatment followed by 30 days of residential follow-up support care but no outpatient care) would have incremental earnings of approximately \$133 per month. In other words, other things being equal, a client receiving this amount of treatment would have predicted earnings \$133 per month higher than a client receiving no treatment. The cost of this treatment would be approximately \$2,050. Thus, the cumulative earnings of a hypothetical client completing a standard regimen of intensive inpatient treatment and follow-up residential care would equal the cost of such treatment (\$2,050) in approximately 15 months.

This analysis implicitly assumes that clients do not relapse and re-enter treatment. However, this assumption could be questioned, since it is known that at least some clients do relapse and re-enter treatment within 12 months. Figure 14 shows a second break-even point for a hypothetical client re-entering intensive inpatient treatment and staying 14 days. As shown, the effect of this is to raise treatment costs from \$2,050 to \$2,610 and to increase the break-even point to 19.6 months. Thus, even assuming relapse and re-entry for additional treatment, the client depicted in Figure 14 would have cumulative earnings equal to the full costs of treatment within 20 months following the initial treatment episode.

IV. CONCLUSIONS AND POLICY IMPLICATIONS

The findings of this analysis need to be interpreted within the context of the study's limitations. The major limitation of this study arises from the observational nature of the data. As with all studies based on observational data, inferences regarding outcomes and the effects of treatment should be made with caution. Although we were able to control for a number of client factors—most importantly pretreatment employment experience—it is possible that one or more unmeasured factors related to treatment may have confounded the analysis. Whether the potential bias is serious or not is unclear. In fairness, it should be noted that no study of this kind for practical reasons could randomly assign clients to treatment and control groups.

Aside from the question of internal validity, there are other less important limitations. Not all clients were matched by the earlier ORDA study to employment records. We assumed these (121) clients did not obtain employment and therefore had zero earnings, but this may not be true in all cases. Some clients may have had earnings that went unreported. There is no feasible way of assessing the extent to which this may have occurred. However, we do not believe it is a significant problem, nor do we believe it is a potential source of serious bias, since the unmatched group was roughly evenly divided between the treatment and comparison groups and collateral data on medical care use and other outcome variables indicated that the great majority of these

clients continued to reside in the state. It is also possible that clients who had reported income also had *unreported income* from temporary or other jobs. Thus, the data reported in this study should be viewed as a lower bound estimate of clients' (legal) earnings.

An additional limitation concerns the client data provided for this study. Information on clients was gathered from the records of the assessment centers and from the programs. A sizable number of items had missing or incomplete information. We used a coding scheme that allowed the observations with missing data to be retained in the analysis (by coding binary variables to represent missing cases), but this made it more difficult to interpret the effects on outcomes of client factors. Further, some of the client variables analyzed (e.g., mental health status and severity of dependence) were based upon subjective impressions of assessment center counselors. The reliability of this information is unclear.

Several important conclusions regarding treatment outcomes related to employment emerge from our findings. These include the following:

- 1) *Inpatient care appears to have a greater impact on employment and earnings than outpatient care for indigent clients with serious alcohol and other drug problems.*

This finding stands somewhat in contrast to the results of Holder⁵⁰ and other investigators⁴⁶⁻⁴⁸ who have analyzed alcohol treatment interventions. Research of these investigators suggests that outpatient interventions are as effective as inpatient treatment. But much of this research has involved treatment populations that are relatively stable. Our study population consists largely of unstable clients with serious addictions. For such clients, intensive inpatient residential treatment may be more effective in promoting positive employment outcomes than less intensive, less supervised outpatient treatment.

- 2) *The duration of treatment has an important effect on employment outcomes. Clients staying in treatment longer experience better outcomes, as do clients who complete treatment.*

Our analysis showed a high degree of consistency in the findings related to length of treatment. The evidence strongly suggests that clients benefited from staying in treatment longer. Clients who completed the initial phase of intensive inpatient treatment and then received follow-up residential treatment (recovery house) had better outcomes than clients who dropped out of treatment early. Completing the full continuum of care appears to convey added benefit in the form of improved employment outcomes.

These findings also contrast with findings reported by Holder⁵⁰ and other investigators,⁴⁶⁻⁴⁸ which have shown little difference in outcomes for clients

staying longer in alcohol treatment. Differences in treatment populations, however, may explain the different findings. Our analysis strongly suggests that with respect to employment outcomes length of treatment does matter. Length of treatment, and whether the client completes treatment, were strong predictors of employment outcomes. Completing treatment seems to be especially important, independent of modality or length of treatment.

3) *The benefits of treatment in terms of enhanced earnings compare favorably with the costs of treatment.*

Treatment represents a sizable investment of resources. The "return on this investment" in terms of improved employment or other outcomes is an important policy issue. With respect to employment outcomes, the benefits of treatment appear to compare favorably with the costs. Expected incremental cumulative earnings for a hypothetical client completing a standard regimen of inpatient treatment and follow-up residential care would equal treatment costs within approximately 15 months following treatment.

What are the policy implications of our findings? Put simply--***less treatment may not necessarily be less costly.*** Limiting coverage for chemical dependency treatment for public clients will reduce short-run treatment costs, but may also compromise the important benefits of treatment, such as enhanced employment.

There appear to be important tradeoffs between treatment and outcomes. Limiting treatment access to reduce costs in the short run may be "*penny-wise and pound-foolish*" public policy. What is needed are effective organized systems of assessment and referral to ensure that clients needing more expensive inpatient treatment receive it, while clients needing less costly outpatient or residential treatment receive that care.

This study has a second, less direct, implication for treatment and clinical management. Pretreatment employment is a critical factor associated with clients' post-treatment success in obtaining employment. This is probably due to various factors, including work habits, attitudes, and skills that employment fosters. Supplementing treatment with vocational services may be a highly cost-effective approach to improving employment outcomes.

Becoming fully economically independent is a goal that in all likelihood few of the clients represented in this study will be able to achieve and sustain. But by helping clients overcome their dependence on alcohol and other drugs, treatment provides a critical function that moves clients on a trajectory toward increased economic independence.

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APPENDIX

The multivariate analysis performed for this study involved estimation of a series of multiple linear regression equations and logistic regression equations. The general form of these equations is as follows:

Multiple Regression Linear Model:

$$Y_i = a + b_1T_i + b_2X_i + e_i$$

where Y_i is some employment outcome variable for the i th client, a is a constant term, T_i is a vector of treatment variables for the i th client, X_i is a vector of covariates (client variables) for the i th client, and e_i is an error term assumed to have normal properties. The coefficients of interest are b_i , which provide information about the effects of treatment holding other factors constant. The statistical method used to estimate the above equation was ordinary least squares regression. We performed specification tests to determine whether the model's error terms conformed to the standard assumptions. Departures from normality occurred infrequently and were not considered serious.

The percent of the variance explained (R^2) differed somewhat among the equations estimated but was generally in the range of .17 - .29. In other words, the predictor variables included in the model explained approximately 17% to 29% of the variance in employment outcome measures. The estimated coefficients and t-statistics are shown in Table A-1 in the appendix.

Logistic Regression Model:

$$\text{Log} (P_i/[1 - P_i]) = b_1T_i + b_2X_i + e_i$$

where P_i is the probability of gaining substantive employment at some time during the follow-up period and the other variables are specified as described above.

$\text{Log} (P_i/[1 - P_i])$ is the logarithm of the odds of becoming substantively employed. The coefficients of interest are b_i , which provide information about

the effects of treatment on the log odds of becoming substantively employed. Only did the treatment measure achieve significance (Table A-1). As shown, clients completing the full continuum of treatment were almost twice as likely (odds ratio 1.97; $p < .01$) of gaining substantive employment as comparison-group clients. On the other hand, clients who dropped out of treatment were only 68% as likely (odds ratio .68; $p < .10$) of gaining substantive employment as comparison-group clients.

Covariates:

The vector X in the equation represents covariate factors that were included in the model. These factors are listed below:

	Variable	Form of Measurement
1.	Living Arrangement	Dummy Variables
2.	Ethnic Group	Dummy Variables
3.	Education	Dummy Variables
4.	Client Age	Continuous Variable
5.	Number of Disabilities not Drug-Related	Continuous Variable
6.	Marital Status	Dummy Variable
7.	Previous Detoxifications	Dummy Variables
8.	Previous Admissions to Treatment	Dummy Variables
9.	Age at First Use	Continuous Variable
10.	Severity of Dependency	Dummy Variables
11.	Primary Substance of Abuse (Drug/Alcohol/Both)	Dummy Variables
12.	Gender	Dummy Variable
13.	Percent Time Employed in Pretreatment Period	Continuous Variable
14.	Mental Disability	Dummy Variable
15.	Ever on Probation	Dummy Variable

Table A-1
Abridged Results for Main Multivariate Regression Analysis

	% Time Employed	% Time Substantively Employed	Average Monthly Earnings	Any Substantive Employment
Treatment Measure	Regression Coefficient (t-statistic)	Regression Coefficient (t-statistic)	Regression Coefficient (t-statistic)	(Odds Ratio)
Primary Modality				
Outpatient	0.085** (2.01)	0.087*** (2.48)	103.96*** (3.09)	2.06**
Intensive Inpatient	0.050* (1.40)	0.008 (0.31)	62.81** (1.78)	0.89
Follow-up residential (Recovery House)	0.025 (0.48)	0.016 (0.61)	55.81* (1.37)	1.16
Treatment Duration				
<u>Linear Model</u>				
Inpatient Residential Days	0.0016*** (3.06)	0.00094*** (2.63)	1.30*** (3.01)	1.02***
Outpatient Days	0.0010*** (2.28)	0.00088*** (2.33)	1.04*** (2.88)	1.012***
<u>Quadratic Model</u>				
Inpatient Days			3.23*** (2.57)	
Inpatient Days Squared			-0.016* (-1.75)	
Outpatient Days			2.35*** (2.78)	
Outpatient Days Squared			-0.010* (-1.71)	

Table A-1
(Continued)

	% Time Employed	% Time Substantively Employed	Average Monthly Earnings	Any Substantive Employment
Treatment Measure	Regression Coefficient (t-statistic)	Regression Coefficient (t-statistic)	Regression Coefficient (t-statistic)	(Odds Ratio)
Continuum of Care				
<u>Intensive Inpatient Treatment</u>				
Completed Full Continuum of Treatment	0.144*** (3.48)	0.087*** (2.63)	137.98*** (3.24)	2.21**
Completed Primary Phase	0.069 (1.84)	0.016 (0.52)	44.66 (1.17)	1.42
Dropped Out	-0.0007 (-0.18)	-0.03 (-1.02)	3.27 (0.73)	0.69
<u>Outpatient Treatment</u>				
Completed Full Course of Treatment	0.13*** (2.71)	0.156*** (3.74)	171.20*** (4.26)	6.46***
Dropped Out	-0.003 (-0.048)	-0.006 (-0.13)	14.17 (0.32)	0.29*

*p ≤ .10; **p ≤ .05; ***p ≤ .01 (one-tailed test)

Figure 1: Average Monthly Earnings Prior to Assessment

Number of Months Prior to Assessment	Includes All Clients (n = 667)	Includes Only Clients with Reported Earnings (n = 546)
12	184.73	228.67
11	185.87	230.07
10	183.26	226.67
9	174.58	215.93
8	165.73	204.99
7	142.67	176.45
6	152.15	188.18
5	159.91	197.78
4	144.37	178.56
3	139.96	173.10
2	109.08	134.92
1	73.92	91.42

Figure 2: Average Monthly Earnings Prior to Assessment by Dependency Status

Number of Months Prior to Assessment	Mild/Moderate Dependency (n = 92)	Severe Dependency (n = 489)
12	249.21	164.71
11	235.06	172.50
10	296.59	154.42
9	293.04	141.05
8	272.08	132.27
7	215.71	113.78
6	243.32	124.23
5	269.54	128.19
4	213.15	118.87
3	227.90	108.97
2	190.67	79.90
1	111.83	54.96

Figure 3: Percent Employed Prior to Treatment

Number of Months Prior to Assessment	Includes All Clients (n = 667)	Includes Only Clients with Reported Earnings (n = 546)
12	31.3	38.8
11	30.0	37.1
10	31.1	38.4
9	30.3	37.5
8	29.0	35.8
7	27.3	33.8
6	29.1	36.0
5	33.4	41.3
4	33.7	41.7
3	32.9	40.6
2	27.1	33.5
1	18.4	22.8

Figure 4: Percent Employed After Treatment

Number of Months After Treatment	Includes All Clients (n = 667)	Includes Only Clients with Reported Earnings (n = 546)	Mean % Employed Before Treatment (All Clients)
2	31.5	42.1	29.5
4	34.8	40.0	29.5
6	32.7	42.4	29.5
8	34.4	44.3	29.5
10	34.8	42.6	29.5
12	33.9	41.8	29.5
14	31.9	36.9	29.5
16	29.3	37.9	29.5
18	30.7	35.1	29.5

Figure 5: Average Monthly Earnings After Treatment

Number of Months After Treatment	Includes All Clients (n = 667)	Includes Only Clients with Reported Earnings (n = 546)
1	217.20	268.64
2	184.49	228.18
3	186.57	230.75
4	177.44	219.46
5	186.39	230.53
6	216.41	267.66
7	232.37	287.40
8	243.89	301.66
9	231.16	285.90
10	221.78	274.31
11	239.44	296.15
12	245.66	303.84
13	244.55	302.47
14	213.05	263.51
15	211.54	261.72
16	215.69	266.91
17	224.46	278.10
18	223.21	277.23

Figure 6: Percent Employed After Treatment, Treatment versus Comparison Group

Number of Months After Treatment	Treatment Group (n = 499)	Comparison Group (n = 168)	Mean % Employed Before Treatment (All Clients)
2	37.9	23.2	29.5
4	35.8	22.5	29.5
6	38.6	21.9	29.5
8	39.8	24.4	29.5
10	36.9	27.4	29.5
12	36.8	25.5	29.5
14	32.8	21.7	29.5
16	34.6	19.1	29.5
18	31.4	19.6	29.5

Figure 7: Average Monthly Earningsfor Different Treatment Groups

Number of Months After Treatment	Full Treatment Completed (n = 178)	Primary Phase Completed (n = 164)	Dropped Out (n = 157)	Comparison Group (n = 168)
1	211.75	229.64	327.80	111.60
2	250.97	209.57	191.52	86.61
3	255.98	206.99	195.15	88.48
4	245.69	191.54	194.08	78.99
5	256.05	197.40	202.80	89.48
6	322.93	211.97	228.28	99.46
7	338.70	221.32	244.29	121.55
8	337.53	242.93	251.29	141.17
9	288.41	225.70	263.21	147.89
10	277.11	210.41	263.38	137.23
11	280.51	221.53	333.48	128.22
12	305.82	234.55	332.26	115.23
13	301.95	234.29	329.77	117.46
14	275.97	206.33	267.33	104.99
15	306.13	197.62	245.87	95.71
16	300.39	207.95	260.60	94.87
17	298.83	246.47	251.10	104.72
18	267.16	271.76	260.52	103.10

Figure 8: Percent* of Clients with Substantive Employment After Treatment**

* Percentages based on clients with positive earnings.

** Clients earning \$350 per month, the level of public assistance, were defined as being substantively employed.

Number of Months After Treatment	Full Treatment Completed (n = 178)	Primary Phase Completed (n = 164)	Dropped Out (n = 157)	Comparison Group (n = 168)
1	18.4	23.8	15.9	12.7
2	24.6	20.8	15.7	9.4
3	26.2	18.0	16.3	9.4
4	26.3	15.3	16.2	8.4
5	28.6	17.3	17.1	9.7
6	34.3	19.3	19.0	12.1
7	34.9	20.8	18.7	14.3
8	32.8	21.8	19.0	18.5
9	29.1	21.7	18.7	18.6
10	27.1	20.6	18.7	17.4
11	26.1	19.5	21.5	14.3
12	27.5	19.7	25.2	13.0
13	28.5	20.2	24.1	13.9
14	27.9	19.3	22.3	13.5
15	28.8	19.2	19.9	12.0
16	26.8	20.1	21.8	11.3
17	25.9	23.1	19.6	10.7
18	24.6	20.3	18.9	10.4

Figure 9: Post-treatment Monthly Earnings for Clients at the 75th Percentile of the Distribution

Type of Treatment	Earnings (\$)
Full Treatment Completed (n = 178)	629.00
Comparison Group (n = 168)	343.63

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